

WHAT IS CLAIMED IS:

1. A time alignment system for a scanner comprising:
 - a radioactive source;
 - means of detecting, and producing a signal at the time of radioactive decay of the source; and
 - means of converting the signal into a common reference clock for calibration of the scanner.
2. A system as described in Claim 1 wherein the radioactive source emits positrons and has a half-life longer than six months.
3. A system as described in Claim 2 wherein the radioactive source is surrounded by a medium capable of detecting when the source decays by positron emission and before the positron combines with an electron and they annihilate subsequently producing two gamma rays which may be detected by the scanner's detectors.
4. A system as described in Claim 3 wherein the medium is coupled to means of converting the detection into an electronic timing signal.
5. A system as described in Claim 4 wherein the timing signal is used as a timing reference for the scanner's gamma ray detectors.

6. A system as described in Claim 5 wherein the timing reference serves as a system clock during the timing alignment of all the detectors such that they may all be aligned to this common reference clock.

7. A system as described in Claim 6 wherein all the scanner's gamma ray detectors may be aligned simultaneously to the common system clock.

8. A system as described in Claim 7 wherein the source may remain stationary near the centre of the scanner during the alignment procedure, since the gamma rays are emitted isotropically.

9. A system as described in Claim 8 wherein the source includes a layer of a positron emitting isotope.

10. A system as described in Claim 9 wherein the source includes a cylinder of plastic scintillator, and the layer is placed on an inner surface of the cylinder.

11. A system as described in Claim 10 wherein the source comprises two pieces which are fixed together.

12. A system as described in Claim 11 wherein the source includes a photomultiplier that is coupled to the two pieces.

13. A system as described in Claim 12 wherein the photomultiplier has an anode output which produces the signal whose

amplitude is proportional to the positron energy each time a positron is detected.

14. A time alignment method for a scanner comprising the steps of:

placing a radioactive source in a generally central location in the scanner;

detecting, and producing a signal at the time of radioactive decay of the source; and

converting the signal into a common reference clock for calibration of the scanner.